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ENVIRONMENTAL HEALTH IN THE TRUST TERRITORY OF THE PACIFIC ISLANDS

Donald M. Keagy, et al

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A REPORT ON ENVIRONMENTAL HEALTH

in the

TRUST TERRITORY OF THE PACIFIC ISLANDS

DONALD M. KEAGY
Sanitary Engineer Director

and

RICHARD A. CODDINGTON
Senior Sanitary Engineer

Environmental Control Administration
Environmental Health Service
Department of Health, Education and Welfare

FEBRUARY, 1970

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INTRODUCTION

This is a report of observations, conclusions, and recommendations based on a field trip in the Trust Territory of the Pacific Islands (T.T.) by two sanitary engineer officers of the U. S. Public Health Service (PHS) from August 25 to September 15, 1969. The two officers, of the Environmental Control Administration (ECA), Consumer Protection and Environmental Health Service (CPEHS), were Donald M. Keagy, Regional Environmental Control Director, Region IX office, San Francisco, California, and Richard A. Coddington, on a two-year assignment as Environmental Health Administrator, Department of Health and Social Services, Government of Guam, Agana, Guam. They were accompanied during the entire trip by Nachsa Siren, Director, Division of Environmental Health, Department of Health Services, T.T., Saipan, Marianas Islands.

Shortly after his arrival in Guam in July 1968, Coddington began sending intelligence in the form of newspaper clippings, memoranda and other materials to the Regional Office relative to the political, economic, social and public health conditions and developments in the T.T. These were discussed with Keagy during his field trip to Guam in August 1968 and during Coddington's subsequent visit to the Regional Office in July 1969.

It was concluded that a current evaluation of the situation was desirable for the following reasons: (1) no environmentalist from the Department of Health, Education and Welfare (DHEW) had been to the T.T. since the Spring of 1963; (2) the Department of Defense (DOD) was reported to have plans to pull back from Okinawa, Japan and the Philippines which would have considerable health impact on the T.T.; (3) the DHEW has a role in funding comprehensive health planning activities in the T.T.; and (4) it was anticipated that there would be a demand upon DHEW to expand the scope of its activities to improve the health conditions in the T.T. Following discussions with and concurrence by the Regional Assistant Administrator (RAA) and the ECA headquarters, telegrams were exchanged between the DHEW Regional Director, Region IX, the High Commissioner of the T.T. and the Governor of Guam, which established the basis for a visit by Keagy and Coddington.

It was originally intended to visit all six Districts but, due to limited time and funds and because of air transportation scheduling problems, a two-week itinerary was developed covering Saipan (Marianas District), Truk Lagoon (Truk District), and Kwajalein and Majuro (Marshalls District). Subsequently the

itinerary was altered considerably due to air transportation circumstances. The travel actually accomplished was as follows:

August	25	- Arrive Saipan in P.M.
	26	- Saipan.
	27	- Leave Saipan in A.M. (delayed on Guam--grounded).
	28	- Leave Guam and arrive Moen Island (Truk District) in A.M.
	29	- Leave Moen and arrive Ponape Island in P.M.
August to September	30 to 9	- Ponape District (stranded on Ponape from September 2-10 due to lack of transportation. Forced to cancel survey of Marshalls District).
	10	- Leave Ponape, arrive Moen Island in P.M. (Truk District).
	11	- To Dublon and Fefan Islands (Truk District) via boat.
	12	- To Udot, Tol, Polle, Patta and Wonei Islands (Truk District).
	13	- Keagy leaves Moen in A.M. enroute to San Francisco with brief stops at Kwajalein and Majuro Islands. Coddington and Siren to Dublon, Uman and Fefan Islands in P.M.
	14	- Coddington and Siren to Udot Island.
	15	- Coddington and Siren leave Moen enroute to Guam and Saipan, respectively in P.M.

As a follow-on to this trip, the T.T. asked Coddington to visit the Yap and Palau Districts with Mr. Siren. Due to air transportation conditions again, the visit to the Yap District was cancelled and they were in the Palau District from September 26 to October 3, 1969.

BACKGROUND

Informational background materials which were available to the team included:

(1) Survey Report on Health Conditions and Resources in the Trust Territory of the Pacific Islands by W. H. Aufranc, M.D., Hazel Shortal, and William B. Schreeder of the Region IX Office, DHEW, March 14 to May 11, 1963.

(2) "Micronesia" by E. J. Kahn, Jr. writing as "A Reporter at Large" in New Yorker Magazine, a series in three parts in the June 11, 18 and 25, 1966, issues.

(3) "Micronesia: The Americanization of Eden" by D. S. Boyer, National Geographic Magazine, May 1967.

(4) 21st Annual Report to the United Nations Administration of the Trust Territory of the Pacific Islands, July 1, 1967, to June 30, 1968.

(5) 1968 Annual Report -- Trust Territory of the Pacific Islands to the Secretary of the Interior for Fiscal Year 1968.

(6) Medical Intelligence Report (memorandum) of Koror Island, Palau District from Captain L. P. Eisman, Force Environmental Health Officer, COMNAVMARIANAS, U. S. Navy, to the Chief, Bureau of Medicine and Surgery dated July 22, 1969, (For Official Use Only).

(7) "New Defense Line in Asia", U. S. News and World Report, August 25, 1969.

(8) The Agreement by W. M. Peck, M.D., 1969.

Reference (1) describes the findings during the previous visit by Region IX officials. References (2) and (3) provide excellent historical and cultural information. References (4) and (5) provide much factual and statistical data on governmental organization, staffing, activities, etc. Reference (6) is a recent evaluation of conditions in the Palau District which were observed to be similar in many ways to conditions in the Truk and Ponape Districts. Reference (7) describes the DOD situation referred to in the Introduction. Reference (8) is an excellent description of current public health circumstances by the Commissioner for Health Services. These provide

much important detail and are not duplicated here for sake of brevity. Rather, highlights from these references, along with other information and impressions gained on the trip, are presented throughout this report.

General Description of the Territory

The T.T. encompasses a vast expanse of some three million square miles of ocean. It contains more than 2,000 islands and atolls with a combined land area of only 700 square miles. Only 96 of the islands are inhabited, with approximately 94,500 people (FY 1968). The area covers three major archipelagoes -- the Marianas, the Carolines, and the Marshalls. Guam, the largest island in the Marianas, is not a part of the T.T., but is an unincorporated Territory of the United States (Appendix).

"Micronesia", which the area is frequently called, means literally "tiny islands" and is an ethnic and geographic designation including the Gilbert Islands as well.

The provisionsal headquarters of the T.T. administration is in Saipan, in the Marianas Islands. The local administration is from six District headquarters located on the islands of Saipan, Yap, Koror, Moen, Ponape and Majuro.

Historically, the area was under German influence from the late 1800's to 1914, when Japanese naval squadrons took military possession at the outbreak of World War I. Japan began its formal administration by mandate of the United Nations in 1920. The islands were taken from Japan by the United States in World War II, and became a United Nations Trusteeship in 1947 under United States administration. The nature of the Trusteeship was strategic. The German and Japanese influence is still evident.

Government

The T.T. is administered by the High Commissioner through the Office of Territories in the Department of the Interior. Legislative authority rests within the Congress of Micronesia, a bicameral body consisting of a twelve-member Senate and a twenty-one-member House of Representatives.

Each District has a legislature, which acts under charters granted by the T.T. government. Within a District, municipalities handle local matters. Municipal boundries represent customary geographic-political divisions which may comprise an island, a group of islands or atolls, or a locally recognized area or division of a

larger island. Chiefs and other traditional rulers are recognized in the political organization, and many such persons are "automatically" elected to office.

Economics

The economic structure of the T.T. is based primarily upon subsistence farming and fishing. In the semi-urbanized District Centers, a money economy is developing. In the outer areas, a small amount of cash from the sale of copra adds to a subsistence income. In FY 1968, the total income for the T.T. (exclusive of United States employees' salaries) was estimated at $14,904,672. This amounts to an average per capita annual income of $158 in that year.

The administration has, by law, restricted the ownership of land to citizens of the T.T. The concern of Micronesians over possible outside exploitation of the islands is a major factor in their political posture. Efforts are currently under way to determine and grant individual land ownership.

Transportation and Communications

The District Centers are now served by Air Micronesia (utilizing Continental Airlines planes and crews) on a regular, several-times-per-week basis. Delays due to weather, need for aircraft maintenance or repair, and inadequate scheduling are common. The outlying islands are served infrequently by ships. Land transportation is severely hampered by lack of roads and by equipment in need of repair -- only Saipan has any of what could be termed all-weather roads. Travel on an island from one point to another is frequently a combination of water transportation around the outer edge of the island, utilizing a small outboard motor boat or outrigger canoe, and walking over difficult paths.

Official, inter-island communications is primarily via radio-telegraph and radio-telephone networks. Mail service is sporatic and personal visits are infrequent. Ham radio operation is popular among those who can afford it.

FINDINGS

Saipan

On Saipan we met Dr. Peck, Director, Department of Health Services, and Mr. Siren and discussed the environmental situation in general and the Saipan situation in particular at considerable length with them during the course of our 40-hour visit on the island.

In discussions regarding the potential impact if the DOD pulls back to the Marianas, Dr. Peck expressed serious concern about the inadequacies in the food and water sanitation areas. "There is no decent laboratory in the T.T.", he said, "and we feel the need for a central laboratory but really don't know where it should best be located -- on Saipan, Guam, or centrally-located Truk?" The only reasonably good evaluation of water quality was done by the Peace Corps in the Palau District -- the results reportedly disclose extensive pollution and are available at T.T. headquarters. The Air Force is doing aerial mapping in the islands and they have been asked to include infra-red photography of water pollution. Whether this is actually being done was not determined.

At the T.T. headquarters offices we heard that Glen Wegner, M.D., Deputy Assistant Secretary for Health Legislation, DHEW, had been in the T.T. for eight to ten days. His trip ended the day we were there and we did not have an opportunity to meet him. We understand that his mission was to work with the High Commissioner's Special Coordinating Committee on Budget relative to the possible role of DHEW on health matters in the T.T.

We also met Dr. Brayton (M.D.) who was the health representative on the High Commissioner's Special Coordinating Committee on Budget. He was from Johns Hopkins University and had been in the T.T. about two and one-half months, visiting all Districts and many outlying areas. In about an hour of conversation with him, he indicated that the Committee had talked to almost 100 local groups in the T.T. about the various governmental programs. He did not wish to discuss what recommendations the Committee might make, but we were apprehensive as to whether or not he had looked closely at the environmental health situation or if he concentrated, rather, on the clinical situation. Interestingly, three of the six members of the Committee contracted amoebic dysentery while in the Marshalls District.

We spent several hours with Mr. Jim Kada, number-two man in the Office of Comprehensive Health Planning (on loan from University of Hawaii for two years) going over the comprehensive health plan.

Dr. Tilton, Director of Comprehensive Health Planning was off-island, but Keagy had talked to him at some length on the phone while in Hawaii enroute to the T.T. We were favorably impressed with the competencies and developments in this office.

At the Department of Public Works headquarters, we learned that Hawaii Architects and Engineers, Inc., had, under a T.T. contract, prepared master plans for water supply and sewerage systems for all six District Centers plus the islands of Ebeye and Carlson in the Marshalls District. We spent approximately one hour with Mr. Jim Christiansen, sanitary engineer. He had been with the Peace Corps prior to coming with the T.T., has his Master's degree in solid waste management, is energetic, and spends the most of his time on the Department's water supply and sewage disposal plans.

The afternoon of the one full day on Saipan was spent on a tour around the entire island observing conditions. The water supply system includes a Maui well and ground-level, covered reservoirs for which chlorine was batch-mixed by hand and introduced into the reservoir at the inlet. Layne International Company was on-island at the time doing ground water explorations. The master plan for water and sewerage systems for Saipan was just beginning to be implemented -- it and the one for the Palau District Center are the first to be funded. The funds were made available for rehabilitation efforts following Typhoon Jean of 1968 fame. We noted an elevated water storage tank for typical storage of water for a village from a surface catchment at a higher elevation.

We observed a sewage disposal problem at the Dr. Torres Hospital which had been persisting for some time. The tile field to the septic tank had failed and the effluent had broken out to the ground surface and much of it was flowing to a large hole in the ground where it percolates into the ground again. The odor problem was severe and obvious for some distance. Mr. Siren described how difficult it was to get private groups to correct sanitation problems when they were aware that the T.T. government allowed so many obvious inadequaceis to persist, such as this one.

We observed inadequate solid waste storage, collection and disposal. Uncovered fifty-gallon drums are the usual storage receptable. A few packer trucks, often disabled for repairs, and a few open trucks are the equipment for disposal. We observed one large open landfill where inadequate compacting and covering was attempted and a number of instances of indiscriminate roadside dumping.

There are many small beer halls on Saipan, most of them operated by Palauans on the island. These, and the several restaurants we observed, employed the most basic sanitation practices. Although we were impressed by the valiant effort being made, under the circumstances, the sanitation facilities and practices were nevertheless inadequate.

At the airport, prior to departure, we met Mr. Peter Coleman, Deputy High Commissioner and former Governor of American Samoa. He emphasized, as had Drs. Peck and Brayton, that the members of the Congress of Micronesia were exceptionally astute individuals and they should not be underestimated. We discussed the political topic of current interest -- the sending of a delegation to Washington, D.C., to negotiate an organic act or constitution for the T.T. There is a rapidly growing desire on the part of the Micronesians to be the masters of their own destiny.

Truk District

After a 24-hour delay on Guam, due to a malfunction of the jet plane, we arrived at Moen Island in the Truk Lagoon. This is the site of the airstrip, District headquarters, District hospital, District high school, Catholic Mission, trading center, and the commercial dock.

At the District hospital, we conferred for approximately 30 minutes with Dr. Nagas Kansou, District Director of Health Services, toured the environmental health facilities, and conferred approximately one hour with Messrs. Jesse Quigley, District Administrator, and John Sablan, his deputy. All three officials stated that the number-one environmental health problem in the District was the need for adequate and safe water supplies.

The only community water supply system in the District was the one serving the headquarters complex, and it is inadequate. The source was a shallow well and storage was in several large steel tanks on high ground. The quality was questionable because the sanitarian's test equipment was old and the reagents were outdated.

Mr. Quigley, an energetic young man, felt that one of the best things that could be done in the T.T. was to get as many of the Micronesian staff as possible to the United States for training and exposure to our methods and procedures.

The field trips in the Truk Lagoon were made via jeep and walking on Moen Island, and via outboard motor boat and walking on Dublon, Fefan, Tol, Polle, Patta and Wonei Islands. Approximately 60% of the Truk Lagoon population live on these islands. The three of us were accompanied the entire time by Mr. Cigarette Lorin, Chief District Sanitarian. Two of Mr. Lorin's self-initiated activities of note were his housing surveys and his water supply demonstration projects.

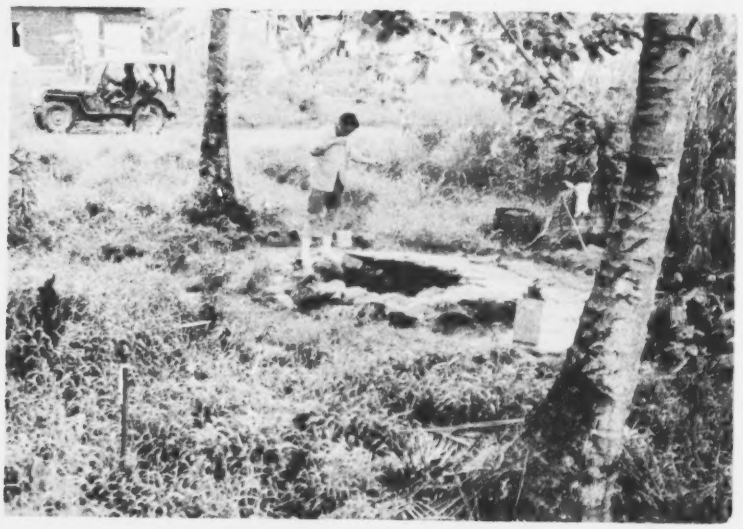
In housing, he had developed survey forms and his sanitarians had been conducting field surveys on an annual basis, for the past several years, to document the basic housing conditions in all of the villages. Such a survey was in progress at the time of our visit and, on Dublon Island, we happened to meet and interview a sanitarian who was engaged in this activity. Regretfully, it appears

Interviewing sanitarian making housing survey

that the data has been used for little more than to educate the sanitarians and to occupy file space.

The basis for the contention that water supply is the number one problem was observed first hand any number of times while in the Truk

District. Despite the relatively heavy rainfall, there are practically no natural catchments and very few streams of any size. Rather, there are some small streams, seeps or springs, unprotected shallow wells, and roof catchments.



Unprotected shallow well

In the case of seeps or springs, the usual practice is to fashion a rough catchment in the rocky ground at the point of seepage -- usually up on a steep slope near a house or group of houses -- and either carry the water in containers, or transport it by old or new pipe or by bamboo trough down the slope to the point of need. The Micronesians (usually the children) often walk considerable distances over difficult terrain to carry water for cooking or drinking purposes.

The women wash clothes in a very primitive fashion. Using a brush, a paddle board and bar or powdered soap, they scrub and beat the difficult-to-remove soil and stains from the clothes. This is usually done on a flat rock and often at the edge of a stream or a pool and requires many hours of time. They also often walk considerable distances over difficult paths to reach these clothes-washing locations.

In those areas where the rainfall is sufficient and the houses have metal roofs, the roof run-off is sometimes collected in 50-gallon drums or other storage tanks. But there is no bacteriacidal treatment

Water storage drums and roof run-off collection system

nor adequate protection from rust, droppings of foreign materials, etc., and it is easy to visualize why the people oftentimes make limited use of these supplies and choose to use, or find it necessary to use, the streams and seeps instead.

We noted several instances where the Peace Corps volunteers had developed a distribution system extending from a pool in a small stream, through plastic or steel pipe, to a centrally-located outlet. But few of these are still in service due to lack of maintenance, removal of sections of the pipe, and other reasons.

Two of these systems on Uman island indicate the types of problems encountered. The construction materials used and construction techniques employed did not lend themselves to minimum operational problems. For example, the PVC pipe was layed on the ground surface and, at one place, we observed that the pipe had been burned through because a fire had been built over it. Watering points were not reinforced and the risers had been bent. Home type faucets were used and were leaking badly. No

real effort had been made to set up a maintenance organization and there were no tools or spare parts available on the island.

On Udot Island, a rather large, fairly-modern school was about to open for the year but the roof-catchment water supply system had not been in operation for some time for lack of maintenance and repair. The school principal advised that there was only one alternative: have the children carry water to school as they had done last year. (Udot is Mr. Siren's home island.)

Since T.T. health funds are not available for construction of water supplies but a limited amount is available for demonstrations, Mr. Lorin and his sanitarians, with the help of local contributed labor, have built six village water supply systems on six different islands at a cost of approximately $800 each for materials and staff per diem expenses. We visited all six projects. In general, they consist of the development of a surface catchment, gravity flow through piping as far as 3000' to a concrete storage tank in the

Community water storage tank

center of the village, and outlets at the tank and at one or two remote locations several hundred feet from the tank. The water is allowed to overflow from the top of the tank (measuring approximately

10' x 10' x 10') such that, when it is full there is a bath shower from above, and a place to wash clothes or fill containers below. At one location we watched three small children fill a drum, replace the screw cap, push it over on its side, and struggle to roll it over the ground to their home -- laughing and chattering all the way.

These water supply projects are greatly appreciated, but knowledge of and attention to maintenance requirements is lacking. As a result, one of the supply systems visited was essentially out of commission and another was in serious need of repair. No District department other than the environmental health group seems to have attempted to do anything about meeting the need for village water supplies. The limited Public Works funds and efforts have been directed almost exclusively toward the needs of the District Center and a few schools.

There are no sewage treatment plants in the District (nor anywhere in the T.T.) and the only sewerage system is located at the District Center. The common method is to defecate on the ground or in an over-the-water facility called a "benjo", which looks like an

Over-the-water toilet -- a benjo

outdoor privy on stilts and is situated at the edge of the high tide mark. More often than not they are located in among the mangrove trees growing in the waters along the shore. Frequently we observed children playing in the deeper pools of water near these "benjos". A beautiful bay of Moen Island has so many of these structures lining the shore that it is known as "Benjo Bay". Raw sewage from the government facilities also emptied into this bay.

We observed only two restaurants in the Truk District -- one at "the Club" at the District Center headquarters, and the other in one of the two hotels in the District. We inspected the kitchen of the latter one and, although very substandard by the United States standards,

Restaurant with hotel rooms above

was remarkably well-operated under the circumstances. The operator was a Micronesian woman who was a trained nurse and who had good knowledge of sanitation and disease transmission. She was obviously making a valiant effort to conduct a sanitary operation with very limited facilities and resources.

Solid waste collection exists only on Moen where a packer truck was observed to be in operation. Disposal was at an open dump. At the villages remote from the District Center and on the other islands, there is low per capita generation of refuse in the form we are

accustomed to in the United States. In their subsistence economy, they catch fish and harvest their coconuts, breadfruit and taro for their main food supply. But some money is earned from selling copra, fish, etc. at the District Center on Moen Island. Very little prepared food is wasted, with dogs and pigs cleaning up any leftovers. The small amount of tin cans, bottles, wrappings, leaves (used as plates) etc. are often placed in a shallow depression and may be covered with vegetative material such as discarded palm fronds, coconut husks, etc. At one location we noted several open drums

Refuse disposal drum in a village

that had been almost buried, upright, in the ground. At least one had a cover on it and it was two-thirds full of refuse. Mr. Lorin stated that this was one of the methods he was recommending to the Truk villages. Apparently, when the drum is full, they simply start another one.

Remembering Keagy's experience in American Samoa, and considering the lack of sanitary facilities, we experienced surprisingly little insect nuisance and very seldom was insect and rodent control mentioned as being a serious problem. The insect spraying activity of the sanitarians undoubtedly accounted for some of this condition.

After first noting the difficulty of simply scheduling flights through the T.T., and then experiencing the 24-hour delay in Guam for aircraft maintenance, we had the transportation problem brought to out attention even more vividly in Truk. The roads that did exist on Moen Island were very rough -- a back-breaking experience to ride over them. The jeep made available to us for ground transportation was in very poor condition and it was a challenge to keep it running. The gasoline fumes were so intense that we invoked a no-smoking rule and leaned out the sides for fresh air. There were no signs of any autos, or even motor bikes, on any island in the Truk Lagoon other than Moen. And yet, on Dublon Island the former site of the Japanese fleet headquarters, we were told that there was once an excellent road system. In one area, this was confirmed as we walked down the remains of a palm-lined concrete highway.

Copra drying on section of Japanese-built concrete highway

Our boat travel to the other islands was fraught with reportedly common problems. On the first day, we were delayed initially by a decision to trade boats with the Health Department dentist who was about to depart to conduct dental clinics on the other islands. We traded out inboard motor boat for his smaller but faster outboard

motor boat. We were delayed further by the need to get more fuel from Public Works but had to delete a visit to Pis Island from our itinerary because they could not furnish us enough cans of gas. Then, enroute, we experienced additional delays due to motor malfunctions and an inability to make our way to shore at intended points sometimes due to tide conditions. There are no docks on the other islands -- you either beach the boat, anchor and wade ashore, or use an occasional stone-pile pier.

Foot travel was, more often than not, very difficult -- alternately progressing over smooth paths, through water and mud, on

Typical of many "roads" -- a slippery path

slippery rocks, or up and down very steep rocky grades. Choice of footwear for the day was always a question -- a pair of low tennis shoes or the sandle-like Japanese 'zori' proved best for most conditions.

Suffice to say that transportation conditions are a major consideration in getting supplies or manpower to a project. And even when these are overcome, there is no hotel or motel on the other islands to house the project staff overnight. This means either returning to the District Center each day, or else accepting a mat on the floor of the dwelling of a Micronesian family.

Ponape District

Although a visit to Ponape was deemed important by the T.T. officials, we had been unable to schedule it because no reservations were available for several weeks on the 16-passenger amphibious seaplane that flies between Truk and Ponape several times each week. However, upon arrival in Truk, we learned that three seats were available for the flight the following morning and we quickly decided to take advantage of the opportunity.

Once again the transportation problems were experienced. During the takeoff run on the Truk airstrip, just as we were congratulating ourselves on our good luck, the takeoff was aborted two-thirds of the way down the runway by a broken exhaust manifold. This would ground the 1941-vintage plane for at least several days while awaiting parts from Honolulu. Fortunately, its incoming sister ship did not need maintenance and was turned around for a special, unscheduled flight later that same morning. A new airstrip is nearly ready at Ponape which will permit the 727 jet, flying between Honolulu and Guam, to include Ponape on its route.

At Ponape, after a water landing in Kalonia Harbor, we were met by Mr. Carl Dennis, Area Sanitarian for the Eastern Carolines and Marshalls Islands, and Mr. Mishuo Amin, Ponape District Sanitarian. These men accompanied us practically the entire time during our ten-day stay on the island and were most helpful in acquainting us with not only the environmental problems but also the related socio-political-economic circumstances.

Ponape is a "high island", like the Marianas, Palau, Yap, and the main Truk Lagoon islands, as distinguished from the "low islands" which are coral atolls, like the Marshalls and most of the Eastern Caroline islands. Ponape is the second largest island in the T.T., and is reputed to be one of the most beautiful islands in the Pacific. Rainfall averages from 200 to 400 inches per year -- by far the most rainfall anywhere in the T.T. This is in the area where the typhoons form which travel west-northwest from here.

Kolonia, the site of the District headquarters, is very similar to an old Western town of the United States -- a dirt street (often muddy) lined with clapboard and corregated metal buildings, including twenty bars (beer only) and a local population of about 3500 people. The District headquarters building is adjacent to the collection of District hospital buildings and not far from the Public Works structures.

The only community water supply system is the one serving the District Center, the hotel, some commercial establishments, and the homes of the T.T. government employees. Only a few of the bars and Micronesian dwellings in the Kolonia area have been permitted to connect to the system "because the supply is inadequate". During our stay in the ten-room Kasalelia Inn, the only hotel in the District, we experienced frequent low-pressure or sudden no-water conditions.

The supply is a surface catchment from an abandoned Japanese airfield, through open channels to a covered reservoir, to what

Discharge from channels around abandoned Japanese airfield which serves as rain water catchment area

appeared to be slow sand filters, followed by chlorination via automatic hypochlorite feed pumps and clearwells. The plant was of Japanese construction and the water was brought down the mountain through two mains following two separate routes to the semi-urban area.

In the villages and at individual dwellings we saw many of the same kind of water supply situations that were observed in the Truk

District: streams, seeps, unprotected shallow wells, roof catchments for water supplies and women and children carrying clothes and water

Washing clothes under common village circumstances

containers. Here, however, the emphasis concerning the development of water supplies for the micronesians was on in-place-construction of concrete, cylindrical tanks for storage of roof catchment water for individual dwellings. There was one village water supply system, but the large concrete tank had failed due to improper concrete construction techniques.

We joined in the deliberations between representatives of the local Community Development program, the Seabees and the Environmental Health Division regarding an initial effort to pool resources and talents to develop a community water supply for two villages where the need was particularly acute. The all-day field trip required a bumpy ride of several miles in a jeep, followed by over three miles of tortuous walking, and finally a boat ride back to Kolonia. Mr. Pete Hill of the Community Development program was the driving force behind this proposed project. He is a statesider who decided to stay in Ponape some years ago and has been well-accepted by the Micronesians. In our many contacts with him during the time on Ponape we had many enlightening debates and helpful exchanges of information on the problems and needs of Ponape and the T.T.

Again, there is no sewage treatment plant and domestic waste is either eventually deposited on the ground or in the waters. Plans have been completed for the construction of a large hospital in the Kolonia area to serve not only the medical services needs but also to be the Territory's teaching hospital. But it seems that there are no plans for treatment of the sewage and it is expected to be discharged raw into the harbor at the mouth of a river.

We conferred with Dr. Enwel Pretrich, District Director of Health Services, who had just returned from a 15-month stay in Hawaii where he earned his Masters of Public Health. He, as well as every other official we met, asserted that water supply was the number-one problem. He indicated that from the Kolonia area alone, they are seeing about 800 cases of amoebic dysentery per year. We could't disagree with him because both Coddington and Keagy apparently experience the malady despite their vigilance and care in what they ate or drank.

We conferred with Mr. Boyd McKenzie, District Administrator on several occasions. Prior to coming to Ponape, he had been the "Distad"

Conferring with Boyd McKenzie, District Administrator, Ponape, at his headquarters

for the Marshalls, Palau and Truk Districts -- the most experienced Distad in the T.T. We found him to be very astute and surprisingly determined to accomplish meaningful objectives despite oppressing constraints of limited funds and discouraging logistics problems. He said that in Palau (his last assignment) he had "sold" water and sewer improvements for the District Center of Koror by initiating a water quality sampling program which demonstrated the gross pollution of the inner reef areas. He believed the estuaries around Kolonia were even more contaminated -- the people swim, fish and take clams in these areas. He was hoping to be able to initiate a similar sampling program here to speed the funding for implementation of the recently developed plans for the water and sewer systems for all of Kolonia. Otherwise he was apprehensive that such improvements would occur for another five years.

The combination dining room-bar-lobby area of the Kasalehlia Inn was a focal point for public information dissemination and public debates. The Distad, Public Works Director, other T.T. government officials, local businessmen, tourists, researchers, Micronesia congressmen, District legislators, Peace Corps volunteers, Seabees, and various company representatives would take many of their meals here and/or come by for beer or drinks in the evening. Due to the length of our stay and the nature of our business, we were part of the discussions and debates many times, and we acquired an excellent education on attitudes, problems, obstacles to solutions, etc. that we would not have obtained otherwise.

One of the more interesting and enlightening individuals we came to know here was Senator Bailey Olter of the Congress of Micronesia who was on the Future Political Status Commission which was to go to Washington, D.C., on the organic act matter. We found him to be particularly astute and articulate -- especially on his favorite subjects: the future of Micronesia and independence for Micronesians.

One of the most interesting and encouraging field trips was the one to the Ponape Agriculture and Technical School (PATS) run by Father Hugh F. Costigan, the famous "Building Priest". This school is dedicated to preparing Micronesians to compete in a developing economy by training them in the trade skills of agriculture, mechanics, and construction. We observed young men students erecting a building on the PATS premises. They had a summer vacation-time contract and to see their agility, speed and skill in masonry and carpentry was indeed heart warming and reassuring.

After touring the excellent facilities and observing some unique hand washing, shower and toilet facilities they had designed and constructed, we had lunch and conversation with Father Costigan. He cited the lack of skilled manpower in the T.T. and of the paucity of funds for training Micronesians. He felt that the best expenditure of money at this time would be for training activities.

On the political subject, Father Costigan expressed his observation that there are many similarities between the present Congress of Micronesia and the founding fathers of the United States. He is convinced that Micronesia has put their best men in their Congress, that they are all statesmen, and that Micronesia will probably never again have a group of this high calibre representing them politically. The present debate ensuing on an organic act represents their strong desire for independence, recognition of their potential development, and yet acknowledgement of their present economic, political and military weakness and thus dependence on the United States at this time -- especially for financial support. The bold, brave voices, such as Senator Bailey Olter's, are getting stronger and may very well prevail soon.

Solid waste management was again very meager. Collection service is provided in the District Center only. Open trucks are used to

Refuse pickup operation at hotel in the District Center of Kolonia on Ponape

collect refuse from a wide assortment of storage containers. Disposal is at an open dump which was a source of concern to Mr. Dick Justice,

Refuse disposal site for Kolonia

District Public Works Director. He said he needed assistance in selecting a new site but apparently had no plans or intentions of changing to a sanitary landfill operation.

Restaurant and bar sanitation was again surprisingly good under the circumstances. In addition to the hotel and District Center "Club", there was a restaurant on "main street" that we not only patronized but we also inspected the kitchen. This restaurant was not allowed to connect to the water distribution system yet (not enough water) and had insufficient electrical power to carry stove, freezers and refrigerators (the motors kept burning out due to low and fluctuating voltages). The food was cooked on kerosene burners. But the kitchen was immaculately clean and by careful and prudent management and ingenious innovations, he operated what we would deem a sanitary facility.

Time is a troublesome dimension in the T.T. When we inquired about a normal day of activity for a sanitarian we learned that he spends from four to six hour per day just getting to and from his places of activity. Because there are few driveable roads or paths and even fewer operable vehicles available, he walks -- carrying his sprayer, test kits, notebook, or whatever supplies and equipment he will need. The average productive time is reportedly from two to four hours per day.

We conferred with Mr. Lorin Peterson, Director of the Peace Corps operations on Ponape. The Peace Corps had once had a large contingent of their volunteers active in health work in the T.T. but for various reasons they were not well accepted by the populace, their projects failed, and they were rapidly pulling out of this area of activity. We viewed the two homes the District Peace Corps Director and his assistant had had built for themselves under contract with local Micronesian builders. One cost $3000 and the other $10,000 and were very well done. We also saw a motel complex being built by a Micronesian contractor which again demonstrated excellent capabilities.

The frustrations experienced in trying to get a seat on the airplane out of Ponape, the exposure to some very heavy rains, the need to cancel the planned visit to the Marshalls District, and the many other problems and inconveniences encountered were more than offset by the opportunity to become more intimately acquainted with the problems, the attitudes and the constraints, and to debate ideas for solutions with responsible persons. We compared our impressions after three days with those after ten days and agreed beyond any doubt that they were significantly different.

Marshalls District

Enroute home, Keagy was able to disembark briefly at Kwajalein and Majuro Islands during refueling and passenger-loading stops. Photographs were not permitted in the Kwajalein area, either from the air or on the ground, for military security reasons, but he was able to see the island of Ebeye from the air. It is a low, small, crowded island in the atoll chain and located closely adjacent to Kwajalein.

At the airstrip on Majuro he met Dr. John Iaman, District Director of Health Services, Marshalls District, who was just returning from a meeting of the T.T. Comprehensive Health Planning Council of which he is Chairman. In the brief discussion time available, Dr. Iaman

declared that the greatest environmental health problem in the Marshalls District is the water supply problem -- especially in the northern islands where rainfall is low. The people are drinking boiled brackish water and coconut juice from the small coconuts on these atolls. He reaffirmed the information we had gained elsewhere that it is planned to utilize the airport runway at Majuro as a rainwater catchment to increase the volume of supply available to the District Center.

Keagy also met Dr. Hicking, Assistant Director of the T.T. Department of Health Services. In the brief conversation with him, it was learned that he was stranded there on Majuro (as we were on Ponape) and that, although he had been trying for several days, he still didn't know when he would be able to get on a plane back to Saipan.

It is to be noted that the low atoll islands, such as those in the Marshalls District, while they do not present some of the logistics problems that the "high islands" impose, they present significant other problems of concern to sanitary engineering such as low rainfall, very shallow surface profile slopes, and very little fresh ground water.

Palau District

About ten days after returning to Guam, Coddington accompanied Mr. Siren to the Palau District to provide him technical consultation on how to best utilize the supplies of equipment he had ordered for constructing a demonstration village water supply on the island of Pelelieu. They had also intended to visit the Yap District.

The trip provided a continuation of experiences in transportation problems. After two attempts to land the DC-6 at Yap Island in rough weather, the pilot decided against it and flew on to Koror Island (Palau District) instead -- they landed with just four minutes of fuel left. Since the fuel supply was on Yap, the Yap passengers were delayed on Koror for three days while awaiting another plane to fly a fuel supply to them. The boat trip to Pelelieu Island was delayed one and one-half hours by a malfunctioning engine and the two-hour ride was on very rough seas. The boat ride back was delayed again for an hour because the propeller came off just as they were departing.

Pelelieu Island is mostly limestone with an abundance of caves and the majority of it is of low elevation. The village on Pelelieu

has about 700 persons in ninety dwellings in a rather compact area. Unlike most of the villages we had seen, this one not only contained a public school but also a municipal building and four sets of government quarters. Public Works was planning a water project for the public buildings in the village while Public Health was planning a demonstration water project for the balance of the village.

The village Council was in session when they arrived and they indicated that this was the sixth group to come look at the village and they hoped that something more than words and looks would come from one of the visits -- this same thought was expressed to us numerous times during our three-week trip in the T.T.

After studying the situation, it was apparent that there was a need for engineering expertise in problem definition and solution, and a need for comprehensive planning for one water supply for the entire village rather than two. However, Coddington provided suggestions for a three-stage water supply and distribution system project utilizing roof water, a reliable shallow well of fresh water (constructed during World Wat II), and the pipe, fittings and tanks that had been ordered.

This trip consumed almost eight days of time -- under stateside conditions it could have been done in about two days.

Summary and Conclusions

A two-man team of sanitary engineers from the U.S. Public Health Service, accompanied by the principal environmental health official of the T.T. government, made a general evaluation of the environmental health situation in the T.T. during August and September 1969. In the course of the visits, the team interviewed approximately thirty responsible officials plus scores of other individuals; took approximately 475 35-mm colored-slide photos, 12 colored-print photos and about 225 black-and-white photos; studied the references noted on page 3 of this report and the other materials shown to them in the various offices visited; and viewed numerous villages and other sites on the fourteen islands visited.

There are significant, basic environmental health problems in the T.T. which promise to intensify greatly as a result of (1) a rapid growth of tourism, (2) a significant increase in activity by the United States military forces, and (3) a rapid growth in economic development. This rapid development will be noted initially in the six District Centers and a few other areas. Modern hotels, restaurants, swimming pools, etc. have already been built on Saipan and are planned for all District Centers.

The basic sanitary facilities are either grossly inadequate or non-existent in the District Centers, and practically non-existent for the Micronesian people themselves in both the District Centers and the outlying villages. This fact seems to be the result of a combination of (1) a simple lack of concern for them on the part of the previously-controlling German and Japanese administrators, (2) a leave-them-alone, preserve-their-culture, go-slow policy on the part of the United States trustee, and (3) a lack of any political or economic plan until relatively recently. Operation and maintenance problems concerning the few facilities that do exist are already appearing.

Correcting the situation will require trained manpower, supplies, and funds. Training and education coupled with demonstration programs alone will not be sufficient because the monetary resources of the people and thus of their government are extremely meager and inadequate. To wait until the economic resources and the education and training levels develop to the point where the Micronesians can meet their sanitary facilities needs themselves would undoubtedly be self-defeating from an economic development standpoint because the lack of adequate sanitary facilities will obviously impede any economic development efforts. Furthermore, such delay may be disastrously late from a health standpoint because influenza-like diseases, infectious hepatitis, ambeiasis, filariasis, and infestation with ascaris, hookworm and other intestinal parasites are already among the principal diseases of the T.T.

The lack of adequate and safe water supplies is the environmental health problem of highest priority. But correction of this deficiency without concurrently recognizing the obvious resultant intensification of the existing waste disposal problems would be most unwise. Central water distribution systems are found only in the District Centers, two of the villages in Palau, a few other villages on Saipan, and on the islands of Rota, Tinian and Ebeye. Center sewerage systems are found only in the District Centers and on Ebeye -- there are no sewage treatment plants anywhere.

Most all Micronesians relay upon unprotected springs, seeps, shallow wells, or roof catchments for their water supplies. Most of their excreta is disposed of in over-water and over-land privies ("benjos") or directly onto the land "when Nature calls". The water-seal toilet program has had limited success.

The T.T. government has prepared plans for providing basic water and sewerage services for the semi-urbanized District Centers.

The plans are now being implemented for the Marianas and Palau District Centers (Saipan and Koror) but the facilities for the other four have not yet been scheduled. Apparently the only real constraint to constructing these badly needed facilities is a lack of funds. In the villages there is some experience on the part of Public Works in constructing a few school roof-catchment water systems, and some experience on the part of several Environmental Health sanitarians and others in constructing central village watering points and roof-catchment storage tanks for individual dwellings.

Solid waste management in the District Centers consists of unsatisfactory storage, inadequate collection and open dump disposal. In the Micronesian villages, the matter is primarily handled on an individual basis by burying, dumping in the salt waters, or spreading on the ground in close proximity to the dwellings. Fortunately, the low degree of affluence of the Micronesian limits the scope and extent of this problem.

The existence of insect vectors of disease and nuisances are apparent in the morbidity statistics and in the descriptions given by several of the medical officers of problems with secondary infections from insect bites. Many potential breeding spots for mosquitoes were noted. Control efforts are apparently meager and of limited success.

Food sanitation is notably deficient in the District Centers, due primarily to a lack of facilities. The developing change from a subsistence economy to a money economy promises to create a significantly greater problem in this area.

Data on injury and morbidity and mortality is practically non-existent and it proved difficult to even get a "feel" for the situation. However, numerous injury-potential hazards were observed and it is to be presumed that the morbidity would be high.

The housing sanitation situation is difficult to evaluate from this trip in that very few homes were entered. However, conclusions can be drawn from the fact that the type of housing ranges all the way from a rather traditional, middle-income, stateside-type dwelling in the headquarters residential areas to the most simple, thatch-covered, open shelter in the Micronesian villages. Practically none of the Micronesian dwellings have either plumbing, or door and window closures, or screens -- many have completely open sides. Food-preparation, lavatory and toilet activities, and work and play activities are

conducted primarily outside the main dwelling unit under other open shelters, when such shelter is desired. The premises themselves are not generally landscaped in any way -- rather, the dwellings and appurtenant structures are simply located on the existing topography with no obvious definition of "property lines".

The environmental health staff is composed of 50+ "sanitarians" and is generally inadequate, in terms of stateside standards of education and training. Their effectiveness, and the effectiveness of even an adequate staff, is limited by a lack of resources, training, and severe transportation and communications problems. There are no professional skills (as we define the term) represented on the staff.

The limited technical resources that hve been utilized or which are potentially available include: the South Pacific Commission, stateside contract employees of the T.T. government, Peace Corps, Navy Seabees, some of the staff of the Catholic mission schools and non-indigenous statesiders who have immigrated. Financial resources derive from local revenues (export, import and sales taxes; reimbursements; and miscellaneous licenses, fines, fees, etc.), and grants and direct appropriations from the United States. The grants and appropriations consitute about 95% of the financial resources available and include four Comprehensive Health Planning grants totaling $358,678 for FY 1970. This sum includes: $99,072 under 314(a), $250,700 plus $69,930 for mental health under 314(d), and $58,976 plus $30,500 in direct assistance for communicable disease control under 314(e).

In many ways the environmental health situation in the T.T. is similar to that on the Indian reservations of the United States in the late 1950's. However, the Micronesian people have more severe financial limitations and perhaps a higher degree of contamination of the environmenta. Before any meaningful environmental health program can be developed, the problem of inadequate sanitary facilities must be solved.

It cannot be overemphasized that the poor transportation and communications systems, together with the fact that the resources of the people are so very meager, constitute major consideration in planning any programs in the T.T.

The total environmental health problem obviously divides into two distinctly different parts: (1) the problem of the existing, semi-urbanized areas with their higher population density; basic but inadequate systems of water supply, sewage disposal, and solid waste management; promise of rapid economic development and population growth; and money economy, and (2) the problem of the villages with their complete lack of sanitary facilities in nearly all cases; anticipated slower growth and development; and subsistence economy.

RECOMMENDATIONS

The recommendations presented below are based upon the findings and experience of the authors of this report concerning the environmental health situation in the Trust Territory of the Pacific Islands (T.T.). The succeeding section of the report contains a discussion of these recommendations.

Recommendation 1. The DHEW should enunciate a policy statement that it will furnish the financial and technical resources necessary to assist the Micronesians of the T.T. manage their environment in a manner and to a degree that will preclude impairment of their health, and that the Environmental Health Service will mount a program that has three major objectives:

(1) establish an environmental management program for the District Centers which will give priority to rapid construction of water supply, sewage disposal and solid waste management facilities,

(2) establish an environmental management program for the villages which will give priority to a sanitation facilities construction program designed to provide water supply and waste disposal facilities, and

(3) establish a staffing and training program for the Environmental Health Division of the T.T. which will develop manpower capable of not only initially participating in the implementation of the two environmental management programs but also eventually and independently maintaining an appropriate ongoing program for the T.T.

Recommendation 2. The T.T. government should expedite the construction of basic water and sewerage facilities for the District Centers, utilizing the recently prepared plans for such facilities.

Recommendation 3. The DHEW should provide long-term technical assistance to the T.T. government in making a

comprehensive assessment of the environmental health situation and in developing and implementing program plans for the management of solid wastes, food handling, radiation sources, water supplies, and the other environmental factors in the District Centers.

Recommendation 4. The DHEW should develop and make available a sanitation facilities construction program for Micronesian homes, similar to that available to the American Indians under P. L. 86-121.

Recommendation 5. The DHEW should develop and make available training for sanitarians which will enable them to handle the environmental sanitation and safety problems emerging as a result of the current economic development and urbanization in the District Centers.

Recommendation 6. The DHEW should take appropriate steps to expand the eligibility for training grants to include citizens of the T.T. as well as U.S. citizens.

Recommendation 7. The DHEW should develop and make available an educational program designed to strengthen the existing efforts in the T.T. directed at improving the basic hygiene practices of Micronesians.

DISCUSSION OF RECOMMENDATIONS

Recommendation 1 calls for a policy determination concerning the role that the DHEW will assume relative to health matters in general and environmental health matters in particular in the T.T.

It asks for an answer to the question about whether we will limit our efforts to Comprehensive Health Planning funding under Section 314 of the PHS Act with infrequent consultation visits from time to time; whether we will make a total commitment to the United Nations Trusteeship Council's goals which the United States subscribed to in exchange for the strategic military privileges granted, namely, to further modern education, sanitation, and economic advancement and to promote the development of the inhabitants toward self-government or independence; or, whether we will assume some posture in between these two extremes? This recommendation and those that follow advocate a major commitment by DHEW.

In making this policy decision, consideration should be given to the United States military plans and objectives, our image in World opinion, a current assessment of our obligations under the Trusteeship agreement, and the role of the Department of the Interior and other Federal agencies. The findings and recommendations resulting from Dr. Wegner's trip (see page 6) may well be the place to begin.

Recommendation 2 calls attention to the fact that the District Centers are experiencing the impact of economic development. The first hotels catering to tourists are already open on Saipan and are under construction in Koror, Moen, Ponape and Majuro. The provision of safe and adequate water supplies and sewage disposal systems will help break the oral-fecal route of infection and will greatly enhance economic development.

The T.T. government has in hand detailed, professionally-developed construction plans for these sanitary facilities in each of the District Centers. Apparently, the only serious constraint to realizing rapid construction is lack of funds, which is beyond the control of the T.T. government.

There are several alternative actions that the U.S. government could take to ameliorate this situation. They include: (1) an administrative decision in the Department of the Interior to earmark more funds for this activity, (2) direct or earmarked appropriations from Congress, (3) construction grants from other Federal agencies, (4) direct assistance from agencies such as the Corps of Engineers and the Seabees, or (5) a combination of any or all of these alternatives.

Recommendation 3 is in recognition of the fact that there are either inadequate or no plans or programs for comprehensive management of environmental health problems in the District Centers other than the water and sewerage facilities construction mentioned above. The Environmental Health Division of the T.T. is cognizant of this fact and the Director, Department of Health Services, has formally requested the assignment of a technical consultant from the PHS for the purpose of helping to correct this deficiency because such competency is not currently available in the T.T.

Recommendation 4 is intended to meet what the authors deem to be a high priority need. The rapid economic and cultural changes now taking place threaten to create an explosive, adverse health situation. The environment in Micronesia is grossly contaminated. There are essentially no sanitary water supply and sewage disposal facilities in the native villages and other areas outside the District Centers. The economic level of the people is such that there is no possibility of their acquiring adequate facilities from local income in the foreseeable future. An education program, although needed, cannot alone correct the problem and it would be essentially valueless without the basic sanitary facilities.

The constraints to realizing construction of sanitary facilities outside the District Centers are the lack of a program design, construction plans and specifications, funds and manpower. In other words, it would be necessary to essentially start at the beginning from a baseline of problem-recognition plus some experience in developing water resources in a few villages.

The sanitation facilities construction program should be designed with the Micronesian home as the target -- both in the District Centers and the villages. The goal would be to provide a safe and adequate supply of water to the home, necessary appurtenances in the home, sanitary disposal of liquid wastes from the home, and sanitary management of solid wastes generated. The method would be self-help.

In the District Centers, where water distribution and sewerage systems are being provided by the T.T. government, the program would concentrate on completing the job by providing on-premise facilities for the Micronesians because they generally cannot afford to "hook up" to the two systems. This means providing service lines from the water main in the road to the home, providing waste line connections from the home to the sewer, and making basic fixtures (kitchen sink, water closet, and lavatory) available in the home. On the outer islands and in the villages outside the District Centers, the program would provide not only the on-premise facilities but also the water source storage and distribution systems and the sanitary waste disposal facilities.

The program would include, in addition to the facilities design and construction activites, appropriate efforts to:

1) stimulate Micronesians to actively participate in the program,

2) train Micronesians to maintain their on-premise facilities, and

3) create and train maintenance organizations to maintain the central community facilities.

There are several possibilities for funding a sanitation facilities construction program. These are:

1) Extend the authority of P.L. 86-121 to cover Micronesians of the T.T. as well as Indians.

2) Enact new legislation similar to P.L. 86-121.

3) Provide for such a program with Department of the Interior funds specifically earmarked.

4) Utilize the basic authority contained in Section 314 of the PHS Act.

The most expedient of the possibilities would appear to be the extension of P.L. 86-121. If this were done, however, the program should not be administered by the Indian Health Program because the connotations implied by the name of that agency are not politically acceptable to the Micronesians. A separate program in the Environmental Health Service, which would rely heavily upon a cadre of personnel with experience in the current facilities construction program, should be established.

Recommendation 5 is designed to fill a need on the part of the T.T. sanitation employees. Until the recent trend toward urbanization in the District Centers they have not been faced with the problems incident to such development. But now new restaurants and bars are opening, hotels and motels are under construction, septic tanks are being installed, hotel swimming pools are being built, injury hazards are arising, per capita solid waste volumes are increasing, vector control is becoming more necessary, etc. The economy is switching from subsistence to cash income. The environmental health staff is not experienced or trained to deal with these problems.

An inservice training program for the Micronesian sanitation personnel is needed. Alternatives for providing this training include:

1) a cadre of DHEW environmentalists, stationed on Guam,

2) contract with the University of Hawaii, or

3) DHEW assistance from the Regional Office.

The cadre on Guam, which could also provide continuing consultation on technical problems to both Guam and the T.T., would appear to be the best method.

Recommendation 6 calls attention to the fact that citizens of Micronesia are not eligible for DHEW traineeship grants. Such grants are only available to the U.S. citizens or foreign nationals who have visas in their possession permitting permanent residence in the U.S. A Micronesian is neither a U.S. citizen nor a U.S. national. Our estimate is that each year, for the next several years, there would be 2 to 4 environmentalists in the T.T. who would take advantage of traineeships for graduate training in the U.S. if available. Such training would materially contribute toward achievement of the United Nations Trusteeship Council's goals, which are reiterated above in the discussion of Recommendation 1.

Recommendation 7 concerns the many poor personal sanitary practices noted and reported to us during the field trip. Micronesia is an area where intestinal parasites, gastro enteritis, dysentarys, etc. are prevalent. An educational program to change basic nabits must go hand in hand with the provision of physical facilities if these diseases are to be controlled. Modern techniques, equipment and teaching materials are needed to bolster and improve the existing meager efforts.

The time table envisioned for implementing these recommendations is:

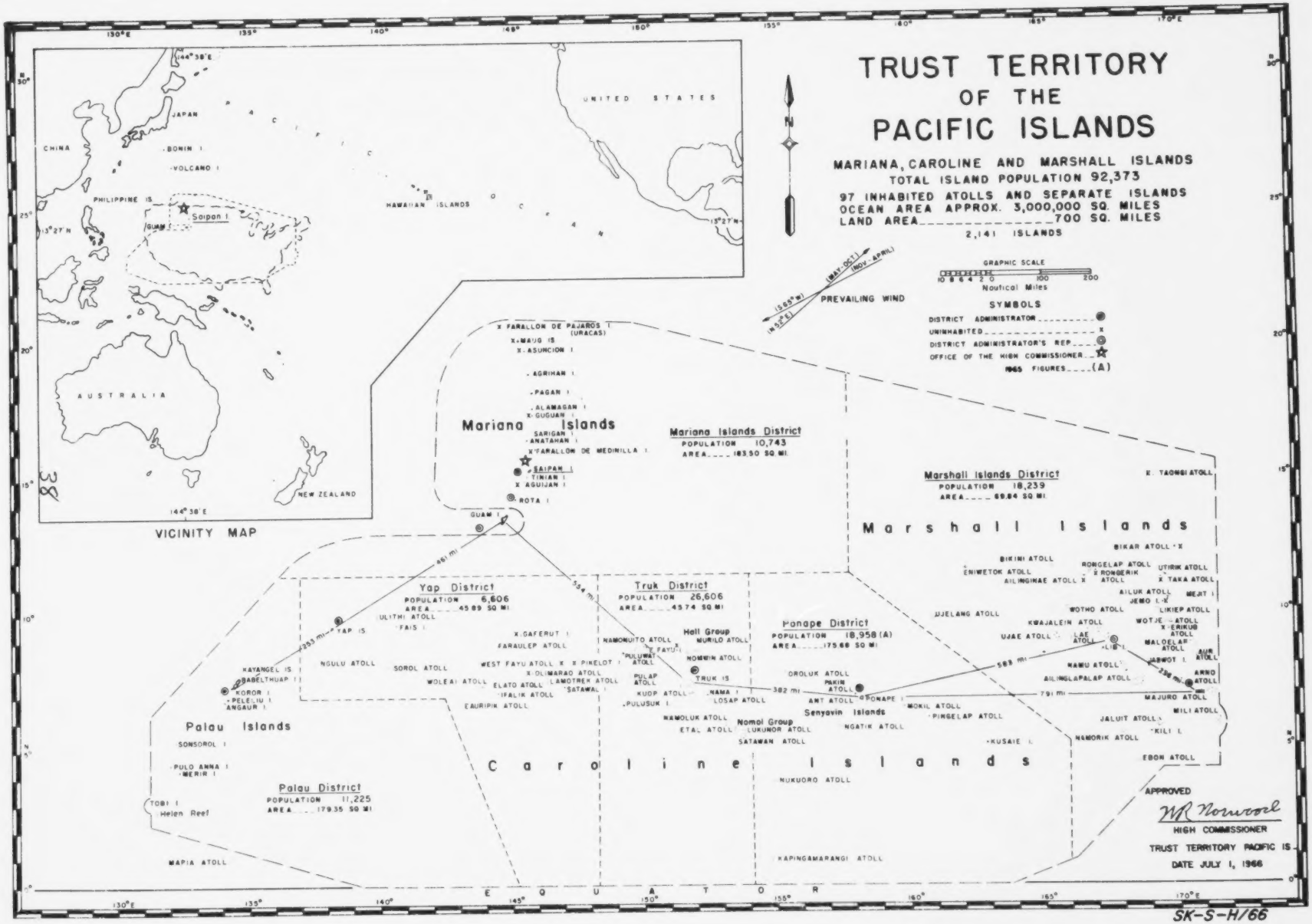
FY 71: Assign environmental engineer to T.T. half-time (other half-time on Guam) to identify constraints, acquire additional data and information, develop preliminary operating plans, provide liaison between T.T. and EHS, etc.

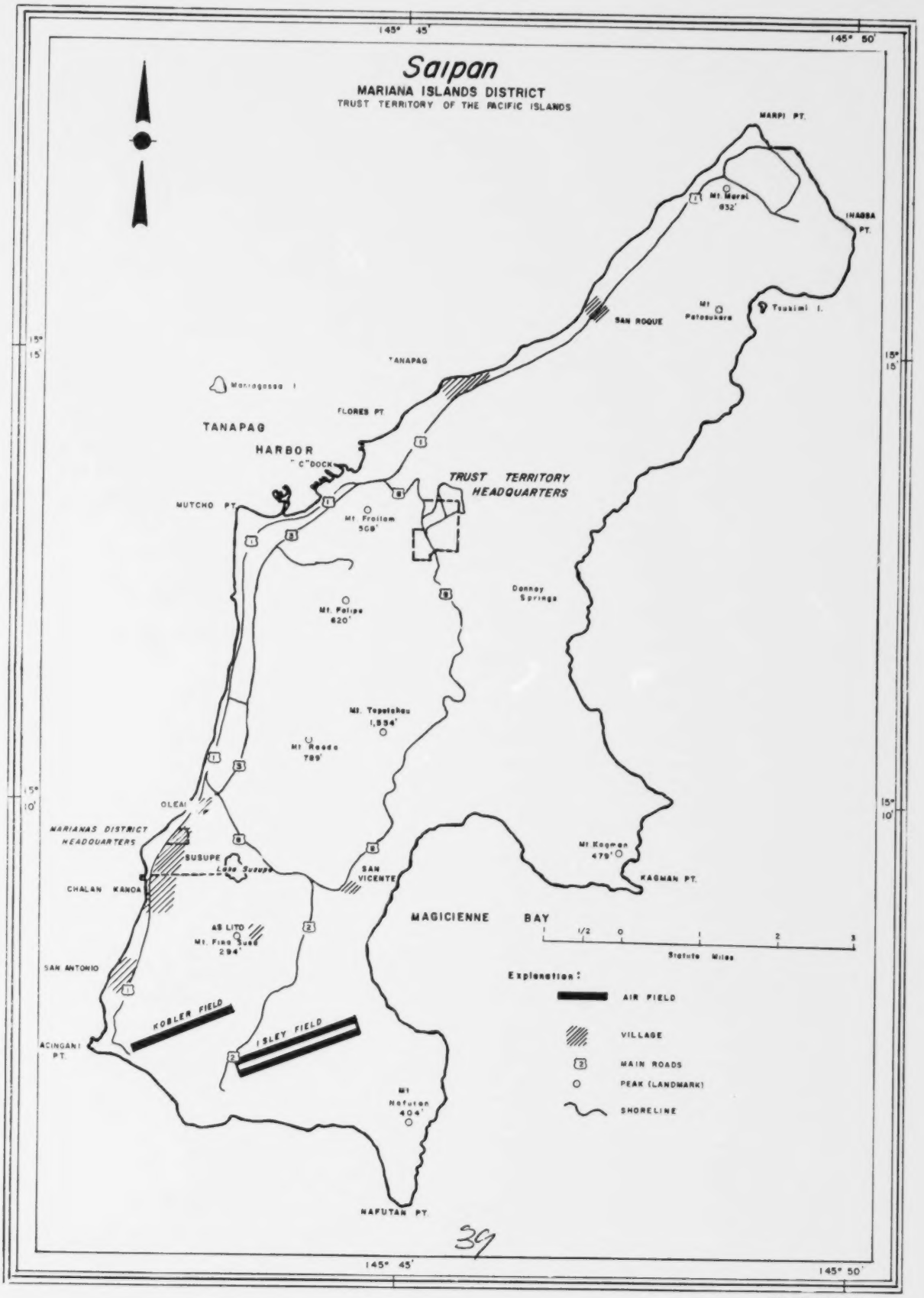
FY 72: Assign cadre of environmentalists (engineer, sanitarian and entomologist as a minimum) to design the training and public information activities, assist in development of detailed operating plans for facilities construction program, provide technical assistance to Guam and T.T., etc.

FY 73: Begin build-up of staff, equipment and services and initiate training and construction programs which would attain peak activity in about three years, when DHEW participation would begin to reduce as the T.T. staff are trained and their consultation and assistance requirements are reduced.

FY 83: Conclude DHEW participation.

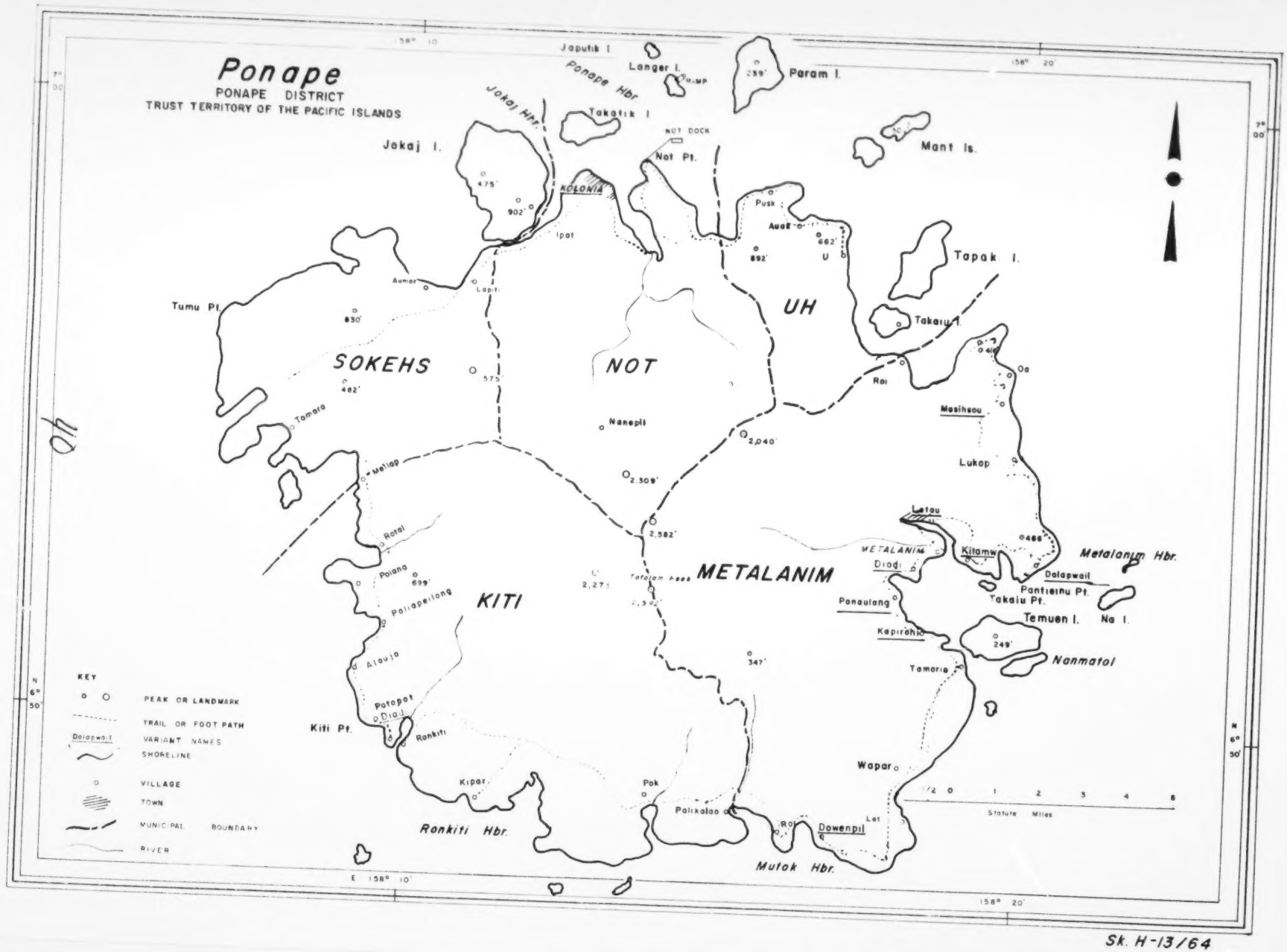
It is difficult to estimate the funds requirements for carrying out the DHEW role, with the information at hand, but a gross estimate for the first two years might be $100,000 for FY 71 and $300,000 to $500,000 for FY 72. Program policy authority and financial management responsibilities should, of course, reside in Washington, D.C., but program planning and operating authority and responsibilities should be delegated to the field because of the unique logistics conditions in the T.T.


TRUST TERRITORY
OF THE
PACIFIC ISLANDS
MARIANA, CAROLINE AND MARSHALL ISLANDS
TOTAL ISLAND POPULATION 92,373
97 INHABITED ATOLLS AND SEPARATE ISLANDS
OCEAN AREA APPROX. 3,000,000 SQ. MILES
LAND AREA 700 SQ. MILES
2,141 ISLANDS
VICINITY MAP
PREVAILING WIND
GRAPHIC SCALE
Nautical Miles
SYMBOLS
DISTRICT ADMINISTRATOR
UNINHABITED
DISTRICT ADMINISTRATOR'S REP.
OFFICE OF THE HIGH COMMISSIONER
1965 FIGURES (A)
Mariana Islands
Mariana Islands District
POPULATION 10,743
AREA 183.50 SQ MI
Marshall Islands District
POPULATION 18,239
AREA 69.84 SQ MI
Marshall Islands
Yap District
POPULATION 6,606
AREA 45.89 SQ MI
Truk District
POPULATION 26,606
AREA 45.74 SQ MI
Ponape District
POPULATION 18,958 (A)
AREA 175.68 SQ MI
Palau Islands
Palau District
POPULATION 11,225
AREA 179.35 SQ MI
Caroline Islands
Hall Group
Nomoi Group
Senyavin Islands
APPROVED
HIGH COMMISSIONER
TRUST TERRITORY PACIFIC IS.
DATE JULY 1, 1966
SK-S-H166


Saipan
MARIANA ISLANDS DISTRICT
TRUST TERRITORY OF THE PACIFIC ISLANDS
145° 45'
145° 50'
15° 15'
15° 10'
MARPI PT.
Mt. Marpi 852'
INARSA PT.
Tsuzimi I.
Mt Petosukara
SAN ROGUE
TANAPAG
Marirogassa I.
FLORES PT.
TANAPAG HARBOR
"C" DOCK
TRUST TERRITORY HEADQUARTERS
NUTCHO PT.
Mt. Frollom 568'
Donnay Springs
Mt. Palipe 620'
Mt. Tapotchau 1,554'
Mt Rasdo 789'
OLEAI
MARIANAS DISTRICT HEADQUARTERS
SUSUPE
Lake Susupe
CHALAN KANOA
SAN VICENTE
Mt Kagman 479'
KAGMAN PT.
MAGICIENNE BAY
AS LITO
Mt. Fina Susu 294'
SAN ANTONIO
KOBLER FIELD
ISLEY FIELD
ACINGANI PT.
Mt Nafutan 404'
NAFUTAN PT.
1 1/2 0 1 2 3
Statute Miles
Explanation:
AIR FIELD
VILLAGE
MAIN ROADS
PEAK (LANDMARK)
SHORELINE

39

Sk.-H-9/64


Ponape
PONAPE DISTRICT
TRUST TERRITORY OF THE PACIFIC ISLANDS
Japutik I.
Langer I.
Ponape Hbr.
Param I.
Jokaj Hbr.
Takatik I.
NOT DOCK
Jokaj I.
Not Pt.
Mant Is.
KOLONIA
Pusk
Auak
Tapak I.
Ipat
UH
Aumar
Lapit
Tumu Pt.
SOKEHS
NOT
Takaiu I.
Roi
Oa
Tomara
Nanepil
Mesihsou
Lukop
Metiap
Latau
Rotal
Kitamw
Metalanim Hbr.
Polapeilong
KITI
METALANIM
Diadi
Dolapwail
Pantieinu Pt.
Takaiu Pt.
Ponaulang
Temuen I.
Na I.
Kapirohk
Nanmatol
Tamorio
Alaujo
Potopat
Kiti Pt.
Ronkiti
Kipar
Pok
Wapar
Palikalao
Roi
Dowenpil
Ronkiti Hbr.
Mutok Hbr.
KEY
PEAK OR LANDMARK
TRAIL OR FOOT PATH
VARIANT NAMES
SHORELINE
VILLAGE
TOWN
MUNICIPAL BOUNDARY
RIVER
Statute Miles
Sk. H-13/64

To Guam 9/15/43
(Coddington & Siren)
From Guam
9/13/43
MOEN I.
UDOT I.
TOL I.
POLLE I.
PATTA I.
FEFAN I.
DUBLON I.
9/14/43
9/15/43

Keagy, Coddington & Sivon field trip to Trust Territory 8/28 - 9/15/69

LEGEND

LETTERING - UPPER CASE : ISLANDS, REEFS, PASSES
lower case : villages
Shore Line
Edge of Reef
Dams
Village Center

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U.S. TRUST TERRITORY OF THE PACIFIC ISLANDS
TRUK DISTRICT
OFFICE OF LAND MANAGEMENT

TRUK-KUOP LAGOONS

REDUCED FROM 50 ENGR. TOPO. BN. MAP

Clemmons - Daniells 1968 6031/68

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